

This Start-up Manual explains mainly the installation and wiring of the FLXA21.

For detailed information and other information, the User's Manual of the FLXA21 should be referred to.

Model FLXA21

2-Wire Analyzer

Start-up Manual

IM 12A01A02-12E 7th Edition

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1. Wiring and Installation

Open the front panel and remove the plastic wiring covers, and then install the cable glands (refer to the Appendix A1). The wiring covers will be re-installed after the wiring is completed.

1.1 Installation site

The FLXA21 is weatherproof and can be installed both inside and outside. It should, however, be installed as close as possible to the sensor to avoid long cable runs between the instrument and sensor. When a pH sensor is used, the cable length including the sensor cable should not exceed 20 meters (65.6 feet); 60 meters (197 feet) when using BA10 extension box and WF10 cable. For a conductivity sensor the cable run should not exceed 60 meters (197 feet). For dissolved oxygen the sensor cable run should not exceed 30 meters (100 feet). For SENCOM pH/ORP the sensor cable run should not exceed 20 meters (65.6 feet).

Select an installation site that meets the following conditions.

- Mechanical vibrations and shocks are negligible
- No relay switch and power switch are installed close to the converter
- There is space for cable connection beneath the cable glands
- Not exposed to direct sunlight or severe weather conditions
- Maintenance is possible
- No corrosive atmosphere
- Ambient Operating Temperature: -20 to +55 °C
Humidity: 10 to 95% RH (Non-condensing)
- Water Protection: IP66 (except Canada), NEMA 4X (except Canada), Type 3S/4X (Canada)

If the instrument is installed outside and exposed to direct sunlight, a sun shade hood should be used.

The FLXA21 can be mounted on a wall, pipe or panel when the mounting kit is ordered. For dimensional information please refer to the Appendix A2, Mounting methods.

1.2 Wiring the power supply

FLXA21 is a 2-wire transmitter and can be powered by a DC power supply of max. 40 VDC. The Power Supply voltage depends on:

- The load resistance: impedance of electronic equipment: typically 250 Ohm
- Number of input modules: 1-sensor measurement or 2-sensor measurement.

One (1) Sensor module (1 input):

16 to 40 V DC (for pH/ORP, SC and DO)

17 to 40 V DC (for ISC)

21 to 40 V DC (SENCOM pH/ORP)

Two (2) Sensor modules (2 inputs):

22.8 to 40 V DC (for pH/ORP, SC and DO)

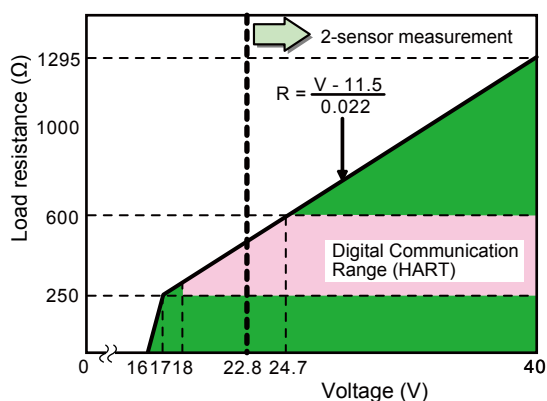


Figure 1 Supply Voltage and Load Resistance for pH/ORP (analog sensor), SC and DO

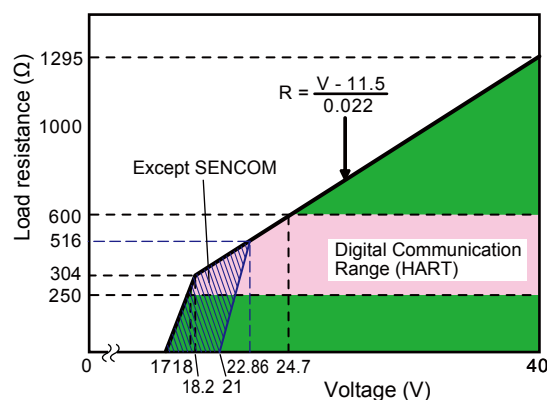
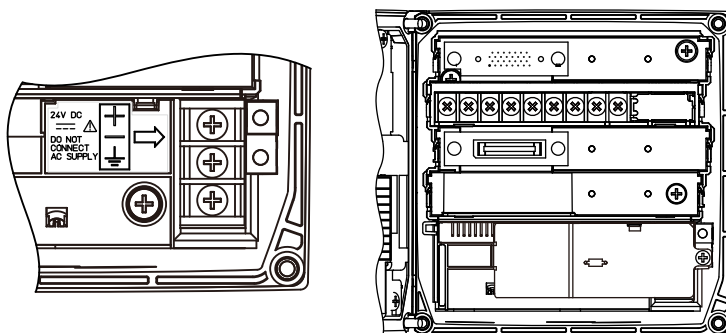


Figure 2 Supply Voltage and Load Resistance for ISC and pH/ORP SENCOM sensor

The power supply is connected to the terminals marked with + and – which corresponds with the polarity of the DC power supply. The shield/ ground is connected to the terminal marked $\frac{\perp}{\perp}$, then replace ground wiring cover.



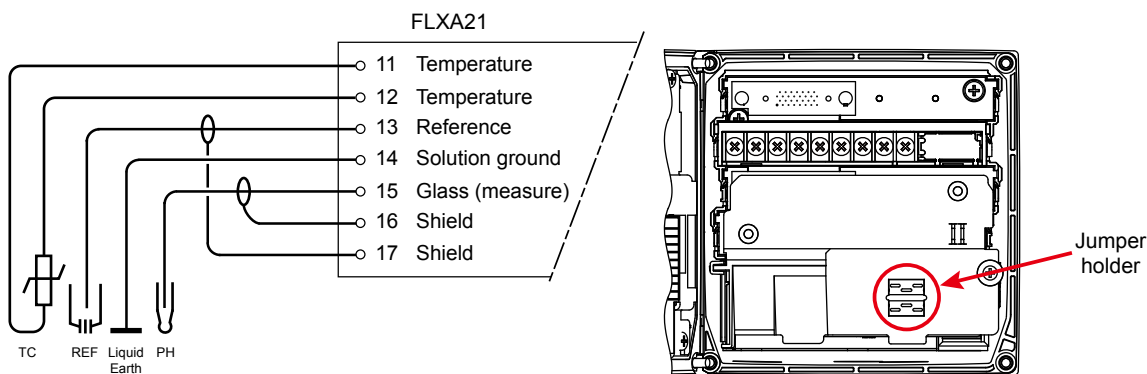
1.3 Wiring the sensor

The FLXA21 can be used with a wide range of commercially available sensor types, both from Yokogawa and other manufacturers. For more detailed information, refer to the respective instruction manual of the sensor. The sensor systems from Yokogawa fall into two categories; the ones that use a fixed cable and the ones with separate cables.

To connect sensors with fixed cables, simply match the terminal numbers in the instrument with the identification numbers on the cable ends. The separate sensors and cables are not numbered, but instead use a color-coding system.

1.3.1 pH Measurement

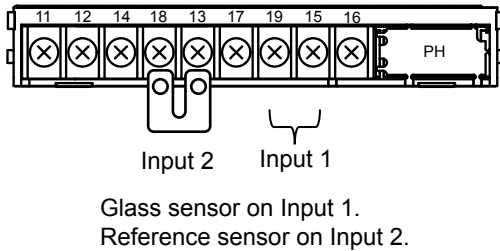
Conventional pH sensors are connected to the module as follows:



In addition to the wiring of the sensor, insure that a jumper for low-impedance sensor inputs is installed. The jumpers can be found on the plastic sensor module cover and can be stored in the lower level module wiring cover.

- pH Glass Electrode is a high impedance sensor input
- Standard reference electrodes and an ORP/REDOX electrode are low impedance sensor inputs
- Special electrodes using 2 glass sensor (example: Pfaunder, SC24V) do not need jumpers.

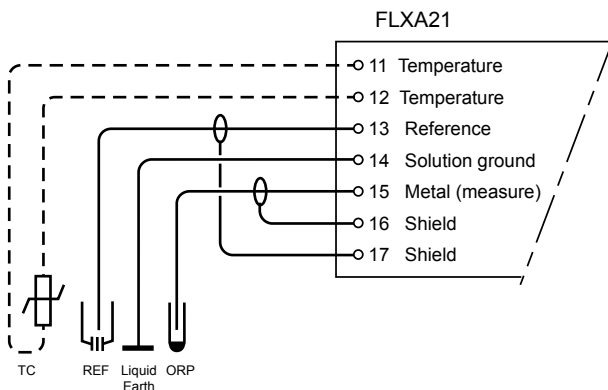
Terminals 15-16 are identified as input 1 (High Impedance) and terminals 13-17 are defined as input 2 (Low Impedance). For conventional pH sensors, the jumper is placed as illustrated:



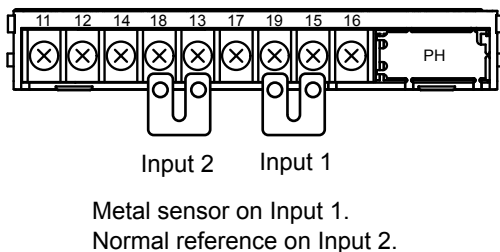
1.3.2 ORP Measurement

The ORP measurement uses the same sensor input module as the pH measurement. It is not uncommon to measure ORP as process variable and a pH Glass electrode as reference. This is the case with rH measurement and with pH compensated ORP measurement.

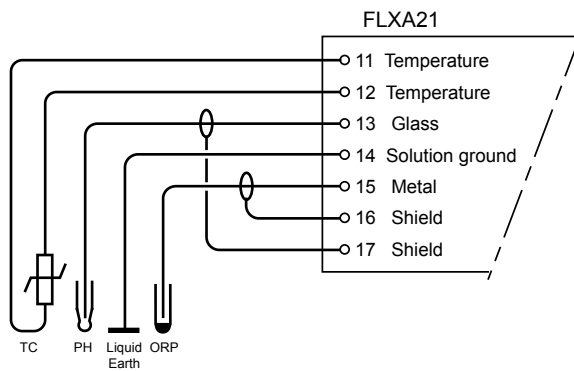
Conventional ORP sensors are connected to the module as follows:



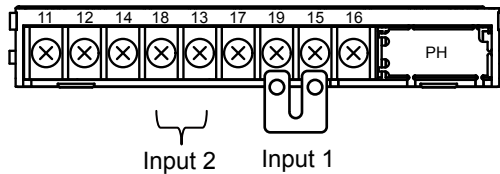
For conventional ORP sensors, the jumpers are placed as illustrated:



pH Compensated ORP sensors are connected to the module as follows:



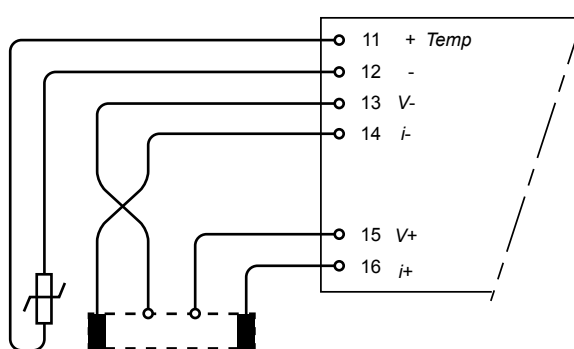
For pH Compensated ORP sensors, the jumper is placed as illustrated:



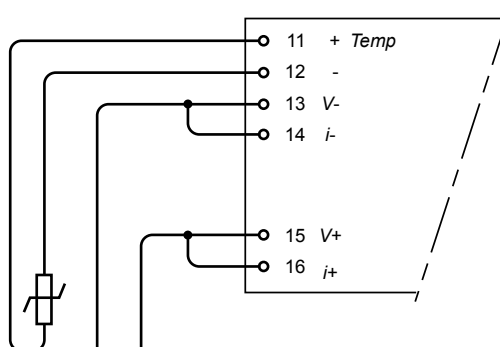
Metal sensor on Input 1.
pH glass (as reference) on Input 2.

1.3.3 SC Measurement

Contacting Conductivity, SC, sensors are connected to the module as follows:

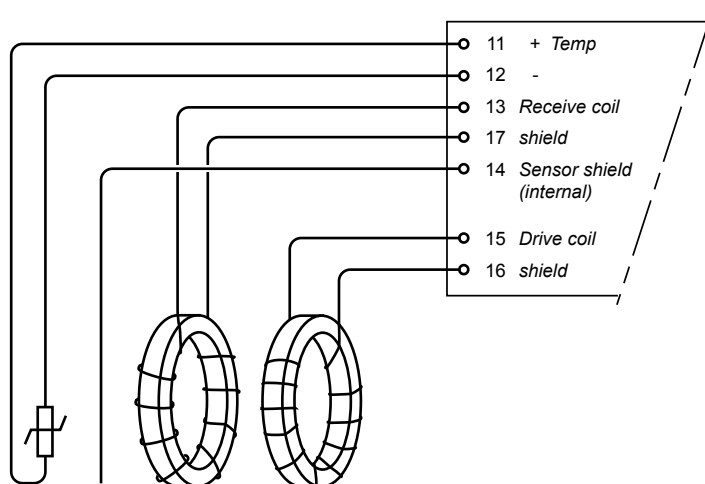


The above diagram shows wiring for 4-electrode conductivity sensors, such as SC42-SP34 large bore series. For 2-electrode conductivity sensors, such as SC42-Sp36 small bore series, jumpers must be installed between terminals 13-14 and between terminals 15-16, as shown in the diagram below.



1.3.4 ISC Measurement

ISC40 sensors are connected to the module as follows:



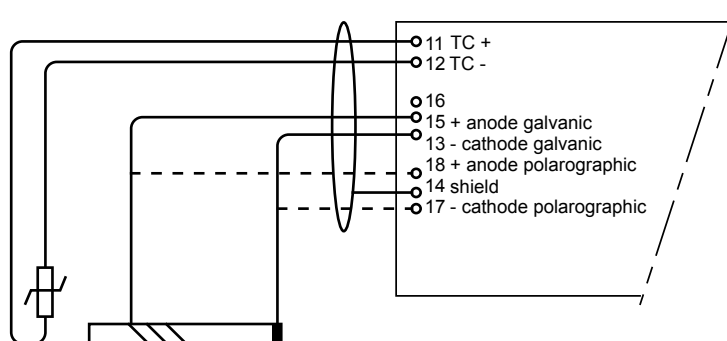
The sensors are supplied with integral cables and each individual wire is marked with the corresponding terminal numbers.

1.3.5 DO Measurement

The input module for DO measurement is suitable for different types of DO sensors:

- i. Galvanic sensors like model DO30G
- ii. Polarographic sensors like HAMILTON'S Oxyferm and Oxygold

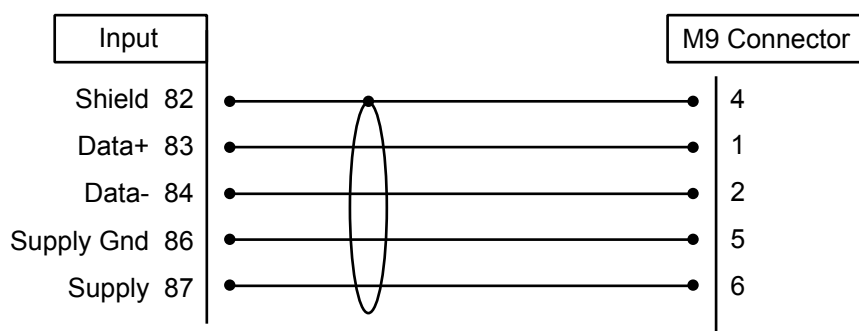
The connection is as follows:



The DO30G sensor comes with integral cable and the wires are labeled with the corresponding terminal numbers.

1.3.6 SENCOM pH/ORP Measurement

FU20F sensors are connected to the module as follows:



1.3.7 Wiring of YOKOGAWA sensors

Sensor	Measurement	Board Terminals							Input 2	Input 1	Jumper	Remark
		11	12	13	14	15	16	17	18/13	19/15		
DO30G	DO	11	12	13	14	15	16					Fixed Cable
FU20 /PH20/FU24	pH, pH & ORP, rH	11	12	13	14	15	16	17	Yes	No		Fixed Cable
FU20 /PH20/FU24	ORP	11	12	13		14			Yes	Yes	13/14	Fixed Cable
FU20 /PH20/FU24	pH Comp. ORP	11	12	15		14		16	No	Yes	13/14	Fixed Cable
FU20-VP /FU24-VP	pH, pH & ORP, rH	E	F	B	D	A			Yes	No		VP6-SC
FU20-VP/ FU24-VP	ORP	E	F	B		D			Yes	Yes	13/14	VP6-SC
FU20-VP/ FU24-VP	pH Comp. ORP	E	F	A		D			No	Yes	13/14	VP6-SC
ISC40	ISC	11	12	13	14	15	16					Fixed Cable
PR20/PR10	pH	11	12	13	14	15	16		Yes	No		Fixed Cable
SC21	pH			Blue	Liquid Earth	Red		(White)	No	No		WU20 Triax
SC24V	pH	E	F	C	H	A	B	D				VP8-DC
SC25V	pH	E	F	B	D	A			Yes	No		VP6-SC
SC29-PTG	pH Comp. ORP			Red	Liquid Earth	Blue		(White)				WU20 Triax
SC29-PTP	ORP			Blue	Liquid Earth	Red		(White)	Yes	Yes		WU20 Triax
SC42	SC	11	12	13	14	15	16					WU40 cable
SC4A	SC	11	12	13	14	15	16					Fixed Cable
SM21/SR20 /SM60	pH	Green: Red	Green: Blue	Yellow: Red	Black	Red: Red	Red: Blue	Yellow: Blue	Yes	No		WU20 Color Coded Coax
SM29 /SR20	ORP			Yellow: Red	Black	Red: Red	Red: Blue	Yellow: Blue	Yes	Yes		WU20 Color Coded Coax
SX42	SC	Brown	Brown	Yellow: Green		Red					13/14 and 15/16	Sensor Wiring

Sensor	Measurement	Board Terminals					Remark
		82	83	84	86	87	
FU20F	pH, pH & ORP, rH	82	83	84	86	87	WU11 Cable

1.3.8 Wiring of HAMILTON sensors

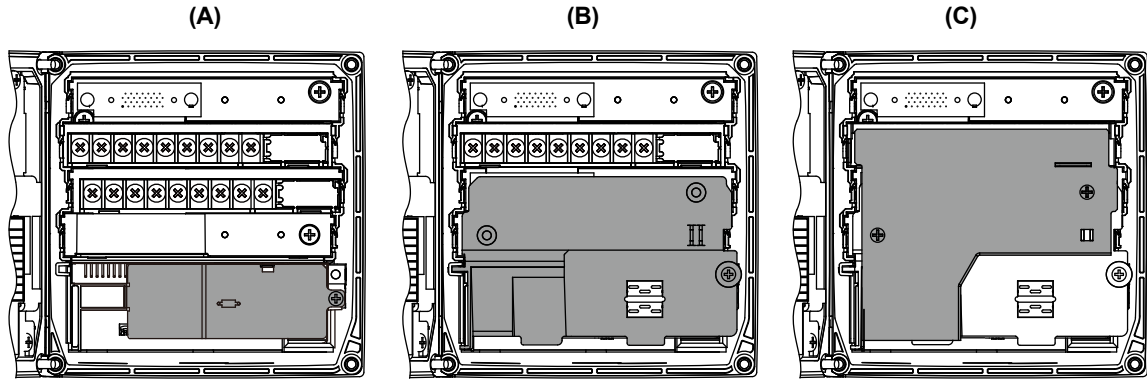
Sensor	Measurement	Board Terminals								Input 2	Input 1	Jumper	Remark
		11	12	13	14	15	16	17	18	18/13	19/15		
CHEMTRODE	pH			Blue		Red		(White)		Yes	No	13/14	WU20D Cable
CHEMTRODE-ORP	ORP									Yes	Yes	13/14	
CHEMTRODE-VP	pH	E	F	B		A				Yes	No	13/14	VP6-SC
CLARITRODE	pH			Blue		Red		(White)		Yes	No	13/14	WU20D Cable
CLARITRODE-VP	pH	E	F	B		A				Yes	No		VP6-SC
CONDCUELL	SC	White/Grey	Blue	Green	Pink	Brown	Yellow						Fixed Cable
CONDCUELL-VP	SC	Blue	Yellow	Black	Black Shield	Grey	Grey Shield						Hamilton VP Cable
EASYFERM	pH			Blue		Red		(White)		Yes	No	13/14	WU20D Cable
EASYFERM-VP	pH	E	F	B		A				Yes	No	13/14	VP6-SC
INCHTRODE	pH	E	F	B	D	A				Yes	No		VP6-SC
MECOTRODE	pH			Blue		Red		(White)		Yes	No	13/14	WU20D Cable
MECOTRODE-VP	pH	E	F	B		A				Yes	No		VP8-DC
OXYFERM-VP/OXYGOLD	DO	White	Green		Green/Yellow			Black	Red				Hamilton VP Cable
OXYSENS	DO	Yellow	Blue		Black			Clear	Brown				Fixed Cable
pHEASY	pH	E	F	B	D	A	B			Yes	No		
POLILYTE	pH			Blue		Red		(White)		Yes	No		WU20D Cable
POLILYTE-VP	pH	White	Green	Red	Blue	Black/Clear				Yes	No		Hamilton VP Cable
POLILYTE PLUS-VP	pH	White	Green	Red	Blue	Black/Clear				Yes	No		Hamilton VP Cable

Color coding of Variopin cables

PIN		A	B	C	D	E	F	G	H
Hamilton	VP6-SC	Black/Clear	Red	Grey	Blue	White	Green		
Hamilton	VP8-DC	Black/Clear	Black Shield	Red/Clear	Red Shield	White	Green	Yellow	Brown
WU20-V-S	VP6-SC	Clear	Brown	Black	Yellow	Red	Blue		
WU20-V-D	VP8-DC	Brown Core	Brown Shield	White Cored	White Shield	Red	Blue	Yellow	

NOTE

When two sensor modules are used, the upper-level module is for input 1 and the lower-level module is for input 2. For ease of installation, first wire input 2 sensor on the lower-level module (A), and attach the wiring cover; then wire input 1 sensor on the upper-level module (B) and replace the module wiring cover (C).

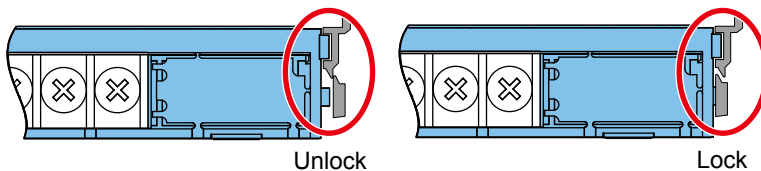


When all wiring is completed and all wiring covers have been installed, the front panel can be closed and the power can be switched on.



WARNING

When one of the modules has been removed and replaced, make sure you lock the module securely in place. Confirm that all locking-tabs (including for BLANK slots) are in “Lock” position before you close the front panel. If the locking-tabs are in “Unlock” position, the front panel may be interfered with locking-tabs.



WARNING

Do not tighten up four front panel screws one by one.

Each front panel screw should be tightened up in two times of screwing. And, firstly the screw at the upper left should be screwed a bit, the next is at the lower right, third is at the upper right, and fourth is at the lower left. The second round is the same sequence again to tighten up four screws.

Do not use an electric screwdriver with high revolutions. If an electric screwdriver is used for these front panel screws, the revolutions of the electric screwdriver should be less than 400 rpm.

Four screws should be tightened to the following torque;

0.8 to 0.9 N•m (for the plastic housing)

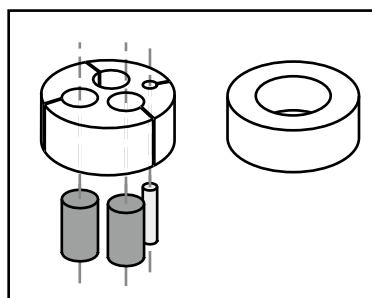
1.5 to 1.6 N•m (for the stainless steel housing)

NOTE

The special grommet is intended to be used to seal the multiple cables from the Yokogawa flow fittings such as FF20.

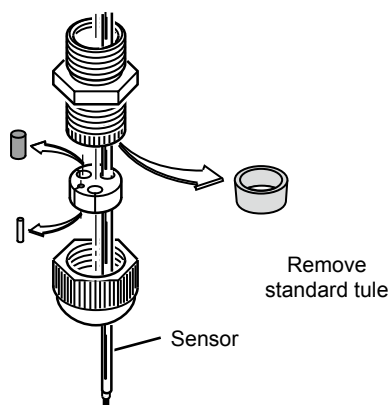
The designated cables are WU20 sensor cables, which are approximately 5 mm (0.2") in diameter, and K1500FV liquid earth cables, which are approximately 2.5 mm (0.1") in diameter.

For sensor systems using a single cable, like the FU20/FU24 and the PR10, PD20, PF20 and PS20, the standard gland will accommodate the cable adequately. Single cables between approximately 6 mm and 12 mm (0.24" and 0.47") can be sealed properly with these glands and the standard tule.



Grommet set

Grommet set use



Content of grommet set

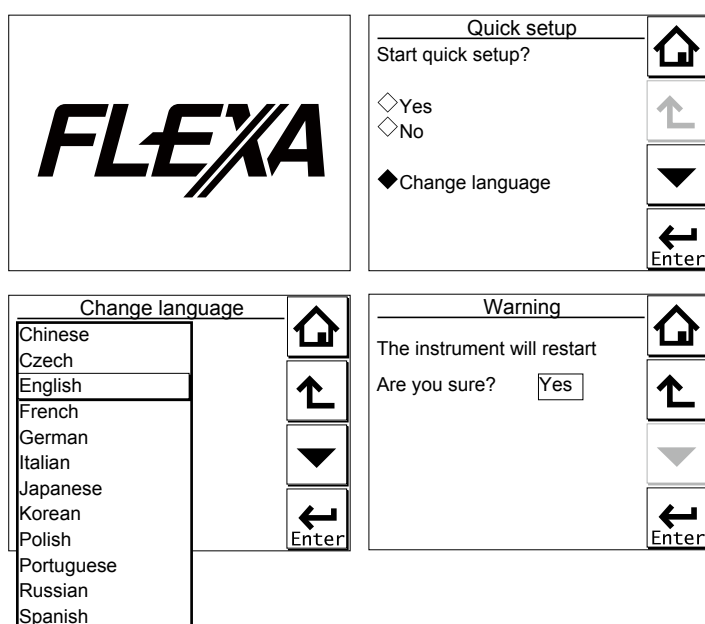
2. Operation

When all wiring is completed, turn on the power to the instrument. Make sure that the LCD screen turns on, and then wait for the Quick Setup menu to be displayed. Follow the on-screen instructions for set-up and calibration. If the instrument is not configured correctly an error indicator may be displayed, or the measurement values displayed may be incorrect. Consult the User's Manual supplied on CD with the analyzer, and check the initial settings and change them to suit your purpose.

Basic operation of the software is similar the EXAxt 450 series. For more detailed information please refer to the User's Manual of the FLXA21.


2.1 Change language

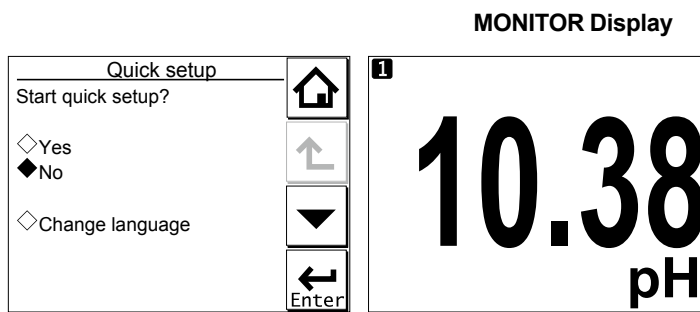
The default language setting for the FLEXA is English. To select a different language other than English, follow the steps below.



2.2 Quick setup


The Quick setup menu is used to program the basic items necessary to make the transmitter operational, such as the date/time and sensor settings. The detailed settings are described in the Commissioning in the User's Manual (for example, chapter 4 for pH/ORP). Each time the FLXA21 is started up, this menu is displayed. If it is not necessary to change the setup, you

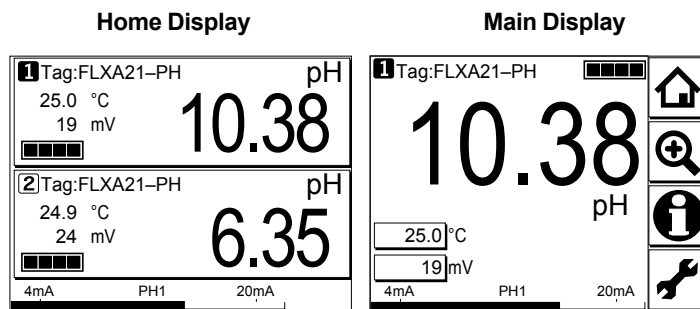
may bypass the Quick setup by selecting No or . When no operation is performed for 10 minutes, the screen changes to the monitor display or the main display (or home display) automatically.



2.3 Basic operation (when two sensors are connected)

When 2 sensor modules are installed, the Home display shows both sensor information at one time, while the Main display will show the individual sensor information. If only one sensor

module is installed, the  is grayed out and disabled on the Main display. On the Home display, pressing the 1st sensor (top) information or the 2nd sensor (bottom) information causes the Main display of the selected sensor to appear.



3. Commissioning

NOTES for Quick Setup:

a. pH measurement module

Under “measurement” a selection is made for pH, ORP or pH&ORP. The selected measurement must be in accordance with the sensor wiring. When rH measurement is requested pH&ORP must be chosen on this level. The rH must then be selected in the commissioning menu.

b. SC measurement module

Under “measurement” a selection is made between Conductivity, Resistivity, Concentration or Concentration plus Conductivity. On this level only Conductivity or Resistivity can be selected. Settings for Concentration measurement must be done in the commissioning menu.

c. DO measurement module

Under “sensor type” a selection is made for Galvanic or Polarographic. The selected sensor type must be in accordance with the sensor wiring. Otherwise the analyzer or sensor can be damaged.

4. Maintenance

■ Periodic maintenance

The FLXA21 requires very little periodic maintenance, except to make sure the front window is kept clean in order to permit a clear view of the display and allow proper operation of the touchscreen. If the window becomes soiled, clean it using a soft damp cloth or soft tissue.

To deal with more stubborn stains, a neutral detergent may be used.

When you must open the front cover and/or glands, make sure that the seals are clean and correctly fitted when the unit is re-assembled in order to maintain the housing's weatherproof integrity against water and water vapor.

The pH measurement uses high impedance sensors and may otherwise be prone to problems caused by exposure of the circuitry to condensation.

CAUTION

Never use harsh chemicals or solvents. In the event that the window does become heavily stained or scratched, refer to the parts list for replacement part numbers.

Appendix

A1 Installing the cable glands

Before installing this instrument, open the front panel and remove the wiring cover, and then install the cable glands.



CAUTION

Be careful not to lose the wiring cover screws.

The supplied cable glands are for cables with an outside diameter of 6 to 12 mm (0.24 to 0.47 inches). Unused cable entry holes must be sealed with cable glands including the supplied close up plugs.

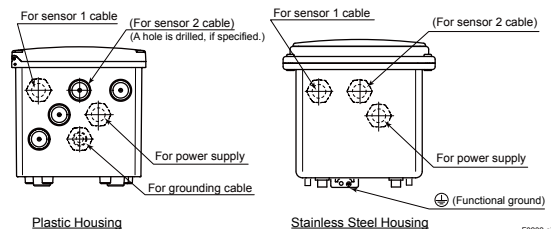


Figure A.1 Cable gland diagram

CAUTION

Be careful not to be injured by the sharp hole edges on the housing.

Install the supplied cable gland as shown in Figure A.2. When using an adapter for conduit work, see Figure A.3.

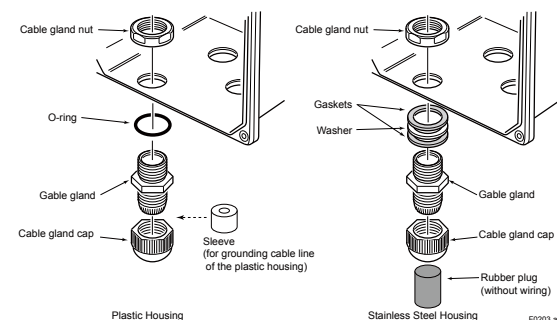


Figure A.2 Cable glands

The unused cable glands should be sealed with the supplied close up plug.



DANGER

When installing cable glands, hold cable glands and tighten cable gland nuts to a torque of 6 N·m. If cable glands, not gland nuts, are tightened, O-rings may come out from the proper positions.

• Adapter for conduit work

When protecting the cable with a conduit, use an adapter (option codes: /CB4, /CD4, or /CF4). Set the adapter as shown in figure 2.4. instead of using the supplied M20 cable gland.

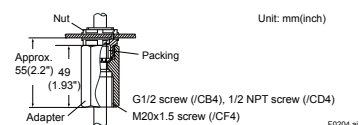


Figure A.3 Adapter for conduit work (option)



DANGER

When using a cable conduit, use a flexible conduit to avoid stress on the conduit adapter. The stress on the conduit adapter may damage the housing.

A2 Mounting methods

Refer to figures 2.25 to 27 and 2.31 to 3.3. The FLXA21 has a various kinds of mounting capabilities.

- Panel mounting using optional mounting hardware (/PM or /UM)
- Wall mounting using optional mounting hardware (/U or /UM) (for example, on a solid wall)
- Pipe mounting using optional mounting hardware (/U or /UM) on a horizontal or vertical pipe (Nominal size 50A)

(Note) The universal mounting kit (/UM) contains the pipe and wall mounting hardware (/U) and the panel mounting hardware (/PM).

A2.1 Plastic housing

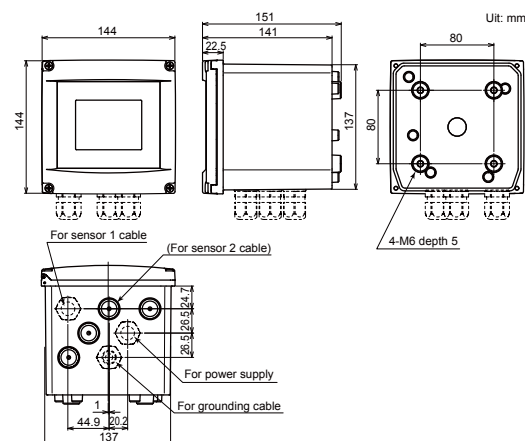


Figure A.4 Housing dimensions and layout of glands (Plastic housing)

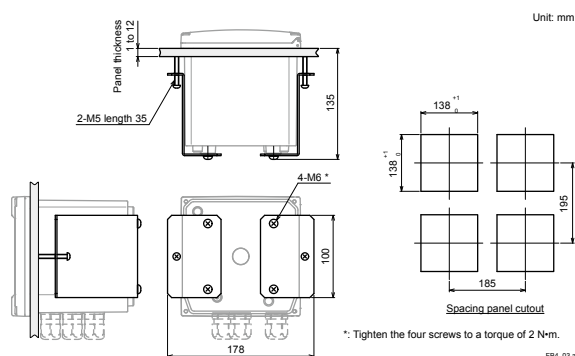


Figure A.5 Panel mounting (Option /PM, /UM) (Plastic housing)

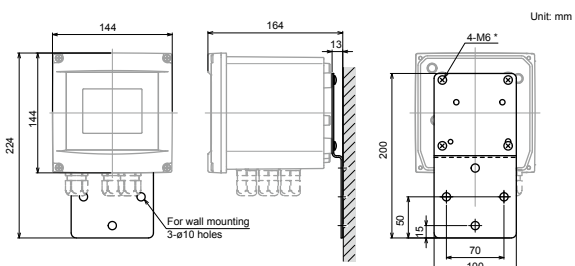


Figure A.6 Wall mounting (Option /U, /UM) (Plastic housing)

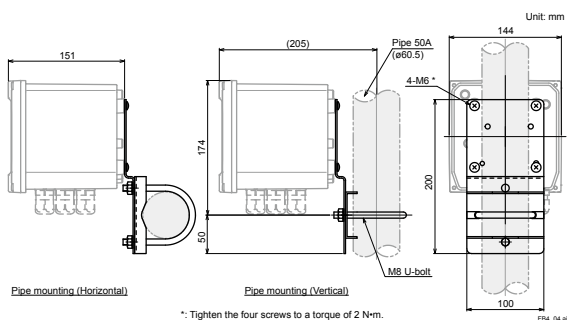


Figure A.7 Pipe mounting (Option /U, /UM) (Plastic housing)

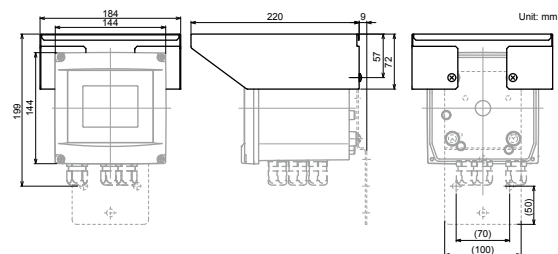


Figure A.8 Housing with stainless steel hood (Option /H6, /H7, /H8) (Plastic housing)

A2.2 Stainless steel housing

The stainless housing with urethane coating (-U) or epoxy coating (-E) has an external plate as shown on figure 2.29.



Figure A.9 Externals of the coated type housing

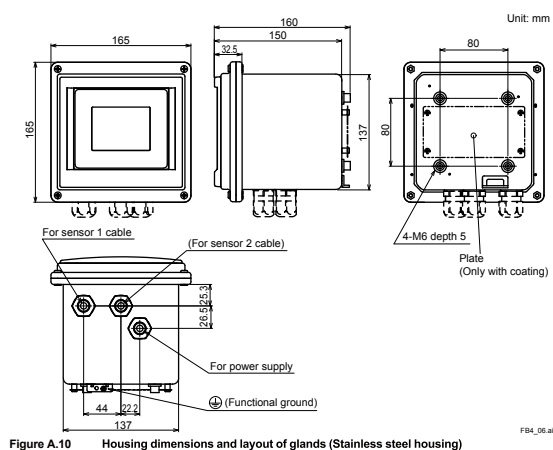


Figure A.10 Housing dimensions and layout of glands (Stainless steel housing)

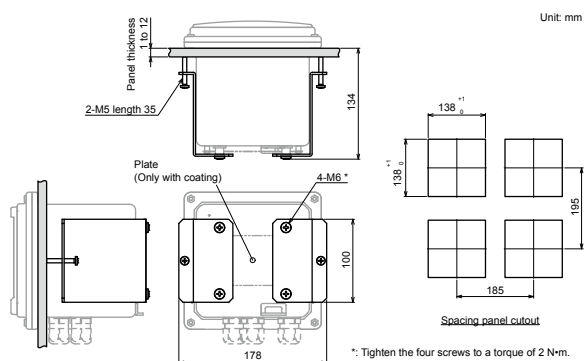


Figure A.11 Panel mounting (Option /PM, /UM) (Stainless steel housing)

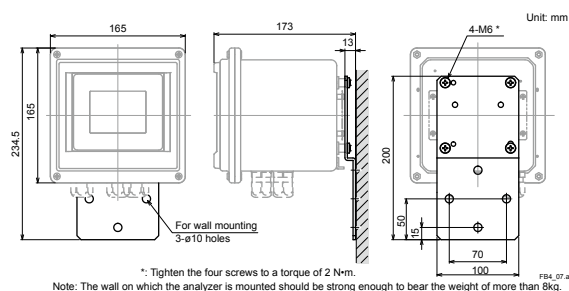


Figure A.12 Wall mounting (Option /U, /UM) (Stainless steel housing)

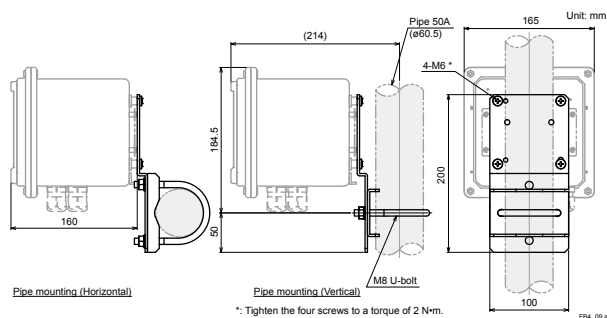


Figure A.13 Pipe mounting (Option /U, /UM) (Stainless steel housing)

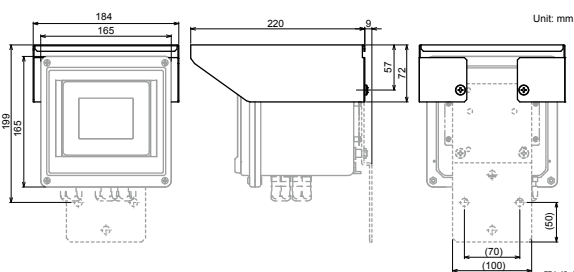


Figure A.14 Housing with stainless steel hood (Option /H6, /H7, /H8) (Stainless steel housing)

Revision Record

- Manual Title : Model FLXA21 2-Wire Analyzer Start-up Manual
- Manual No. : IM 12A01A02-12E

Apr. 2015/7th Edition

Change of “type of ground” of the stainless steel housing (pages 14 and 15)
Note for wall mounting (pages 14 and 15)

Oct. 2014/6th Edition

Correction of discriptions and words

Oct. 2013/5th Edition

Addition of MONITOR display
Correction of discriptions and words

Sep. 2013/4rd Edition

Pages are significantly reduced

Feb. 2012/3rd Edition

Addition of descriptions and drawings for intrinsically safe type
Change of descriptions of messages on displays
Change of figures of housing due to change of position of external grounding for stainless steel housing
Change of figures of wiring covers
Change of description of message language due to addition of message languages
And, other corrections

Aug. 2010/2nd Edition

Followings are mainly revised;

Addition of grounding terminal position on stainless housing with specific mountings
Addition of plate position on stainless housing with specific coatings
Addition of explanation of sleeve for grounding wire for plastic housing
Correction of torques
Addition of Note, Warning etc.
Addition of detail descriptions for wire terminals
Addition of drawings of housing with hood
Addition of example displays for calculated data and redundant system
Addition of explanation of passwords
Correction of errors on the User setting tables

May 2010/1st Edition

Newly published